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Remarks upon certain Cases of Personal Equation which appear to have hitherto escaped notice, accompanied with a Table of Results. By the Astronomer Royal.

"My valued friend, Mr. Sheepshanks, in the course of his micrometrical comparisons of standards *à traits*, discovered (what I believe had never before been suspected,) that when the defining-lines of a standard of length are placed under two micrometer-microscopes, and the moveable wires of the micrometer are made to coincide with the images of these lines, different observers place the micrometer-wires in different positions; and that the difference is not the same with different standard-bars; so that in the micrometrical comparisons of two standards *à traits* there is a personal equation peculiar to each observer. Although the origin of this is very obscure, yet the circumstance that different microscopes are employed for the two ends seems to leave an opening for an explanation: although I am not in any way prepared to say how it can sufficiently account for the discordance observed.

"Mr. Dunkin, however, has lately pointed out to me a case of personal equation which appears more difficult to explain, where the same microscope is used for observing both divisions, namely, in measuring the interval between two adjacent divisions of a graduated circle for the ordinary correction for runs. The phenomenon is so singular that I think it may be worthy of the attention of the Society.

"Mr. Dunkin first discovered this peculiarity in the estimation of the correction for runs of the horizontal circle of the Altazimuth. As the illuminating light is carried there in the observer's hand, I thought it possible that the mode of holding the lamp might account for the difference. I therefore requested Mr. Dunkin to collect in a digested form the observations for the Transit Circle in which the illuminators are fixed, and in which the magnifying power of the microscopes is so great as to give considerable certainty on the instrumental results. These observations (at least their first results) are contained in the table which I now lay before the Society. The number exhibited is the correction for a measure of 100″: it ought to be multiplied by 3 and to have its sign changed, in order to give the apparent excess of the space of 5′ on the limb above a certain definite measure in the micrometer-microscope. The observers are Mr. Henry, Mr. Dunkin, Mr. Henderson, Mr. Ellis, Mr. Todd, and Mr. Criswick: all acute and experienced observers. The observations are so intermixed, in regard of time, that no peculiarity of season or other circumstance that I can discover will account for the difference.

"It will be seen that in each of three years the correction on 100″ found by Mr. Henry exceeds that found by Mr. Dunkin by about one-eighth of a second. The correction found by Mr. Ellis was at first nearly the same as that of Mr. Dunkin; but in later years Mr. Ellis's numbers have approximated more to Mr. Henry's.

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"I subjoin the table, containing the whole of the individual Corrections for Runs, from which these conclusions are drawn.

G. B. Airy.

"*Royal Observatory, Greenwich,*
"1855, *November* 21.

Comparison of the Observations for Correction for Runs of Microscopes of Transit Circle, arranged according to observers.

Month and Day.	Correction for 100″ deduced from the Observations for Correction for Runs of Microscopes of Transit Circle.			
	H.	D.	J. H.	E.
1853.				
Jan. 3	... ...	+0·288		
10	... ...	... ...	+0·347	
17	+0·381			
31	... ...	0·246		
Feb. 7	... ...	... ...	0·350	
14	0·323			
21				
28	... ...	0·246		
March 7	... ...	... ...	0·534	
14	0·427			
21				
28				
April 4				
11	0·340			
18				
25	... ...	0·322		
May 2	... ...	... ...	0·473	
9	0·301			
16	... ...	0·280		
23	... ...	... ...	0·427	
30	0·479			
June 6	... ...	... ...	... ...	+0·246
13	... ...	0·340		
20	... ...	... ...	0·288	
27	0·483			
July 4	... ...	... ...	... ...	0·187
11	... ...	0·361		
18	... ...	... ...	0·357	
25	0·503			
Aug. 1	... ...	... ...	... ...	0·316
8	... ...	0·253		
15	... ...	... ...	0·587	
22	... ...	... ...	... ...	0·378
29	0·448			
Sept. 5	... ...	... ...	... ...	0·295
12	... ...	0·472		
19	... ...	... ...	0·427	
26	... ...	... ...	... ...	0·385
Oct. 3	0·475			

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Month and Day.	Correction for 100″ deduced from the Observations for Correction for Runs of Microscopes of Transit Circle.			
	H.	D.	J. H.	E.
1853.				
Oct. 10	... ...	+0·340		
17	... ...	... ...	+0·417	
24	... ...	... ...	... ...	+0·315
31	+0·406			
Nov. 7	... ...	0·284		
14	... ...	... ...	0·406	
21	... ...	... ...	... ...	0·240
28	0·381			
Dec. 5	0·510			
12	... ...	0·288		
19	... ...	... ...	0·323	
28	... ...	... ...	... ...	0·350
Mean ...	+0·420	+0·310	+0·411	+0·301
1854.				
Jan. 2	0·132			
9	... ...	0·184		
16		... ...	0·305	
23		... ...	... ...	0·360
30	0·333			
Feb. 6	... ...	0·277		
13	... ...	... ...	0·343	
20	... ...	... ...	... ...	0·350
27	0·264			
March 6	... ...	0·354		
13	... ...	... ...	0·406	
21	... ...	... ...	... ...	0·253
27	0·336			
April 10	... ...	... ...	0·455	
17	... ...	... ...	... ...	0·295
24	0·455			
May 1	... ...	0·385		
8	... ...	... ...	... ...	0·486
15	... ...	... ...	... ...	0·465
29	0·284			
June 5	... ...	... ...	... ...	0·500
12	... ...	0·291		
19	... ...	... ...	... ...	0·350
26	... ...	... ...	... ...	0·357

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Month and Day.	Correction for 100″ deduced from the Observations for Correction for Runs of Microscopes of Transit Circle.			
	H.	D.	E.	T.
1854.				
July 4	... ...	... ...	... ...	+0·263
10	... ...	... ...	+0·489	
17	+0·514			
24	... ...	+0·343		
31	... ...	... ...	... ...	0·378
Aug. 7	... ...	... ...	0·448	
14	0·611			
21	... ...	0·284		
28	... ...	... ...	... ...	0·250
Sept. 4	0·442			
11	... ...	... ...	0·361	
18	... ...	0·264		
25	0·517			
Oct. 2	... ...	... ...	... ...	0·395
9	0·497			
16	... ...	... ...	... ...	0·424
23	0·455			
30	... ...	... ...	0·372	
Nov. 6	... ...	... ...	... ...	0·319
13	0·399			
20	... ...	... ...	0·222	
27	... ...	0·177		
Dec. 4	... ...	... ...	... ...	0·257
11	... ...	... ...	0·350	
18	... ...	0·177		
27	... ...	... ...	0·222	
Mean ...	+0·403	+0·274	+0·368	+0·329
1855.				
Jan. 1	0·486			
8	0·392			
15	... ...	... ...	... ...	0·274
22	... ...	0·167		
29	... ...	... ...	0·264	
Feb. 5	0·157			
12	... ...	0·135		
19	0·194			
26	... ...	... ...	0·347	
March 5	0·428			

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Month and Day.	Correction for 100″ deduced from the Observations for Correction for Runs of Microscopes of Transit Circle.			
	H.	D.	E.	C.
1855.				
March 12	... ...	+0·108		
19	+0·455			
26	... ...	... ...	... ...	+0·507
April 2	... ...	... ...	... ...	0·236
9	... ...	... ...	+0·465	
16	0·395			
23	... ...	... ...	... ...	0·326
30	... ...	... ...	0·347	
May 7	0·500			
14	... ...	0·347	... ...	0·240
28	... ...	... ...	0·271	
June 4	0·663			
11	... ...	... ...	... ...	0·316
18	... ...	0·323		
25	... ...	... ...	0·412	
July 2	... ...	... ...	... ...	0·170
9	0·431			
16	... ...	... ...	0·378	
30	... ...	0·458		
Aug. 6	... ...	... ...	... ...	0·204
13	... ...	... ...	0·513	
20	0·497			
27	... ...	0·497		
Sept. 7	... ...	... ...	... ...	0·402
10	... ...	... ...	0·462	
17	0·445			
24	... ...	0·340		
Oct. 1	... ...	... ...	... ...	0·243
8	... ...	... ...	0·472	
15	... ...	0·298		
22	... ...	... ...	... ...	0·319
30	... ...	... ...	0·562	
Nov. 7	... ...	... ...	... ...	0·229
Mean ...	+0·420	+0·297	+0·408	+0·290

Assemblage of Means.

	H.	D.	J. H.	E.	T.	C.
1853	0·420	0·310	0·411	0·301		
1854	0·403	0·274	... ...	0·368	0·329	
1855	0·420	0·297	... ...	0·408	... ...	0·290